"Liszak, Jerry (ECY)" Dear Susan, As a licensed hydrogeologist wit... 01/16/2013 04:06:46 PM

From: "Liszak, Jerry (ECY)" <JLIS461@ECY.WA.GOV>
To: Susan Eastman/R10/USEPA/US@EPA
Date: 01/16/2013 04:06 PM
Subject: RE: Time sensitive! Please review and comment! Fw: Leque Island Groundwater Study

Dear Susan,

As a licensed hydrogeologist with the Washington State Department of Ecology Water Resource Program, I perform technical hydrogeological investigations for water right permitting decisions in Island County, and am familiar with the aquifers and groundwater regime of Camano Island. I have reviewed PGG's December, 2012 report Hydrogeologic Evaluation of Proposed Leque island Restoration. This report confirms my previous understanding of the hydrologic regime of the area.

As I wrote in my February 12, 2010 letter to David Brock at WDFW: On Camano Island, the highest ground water elevations are found near the center of the northeastern area of Camano Island. Groundwater generally flows from the center of the island toward the shorelines where it discharges into saltwater. The area between the mainland and Camano Island is a convergent discharge area of groundwater from both Camano Island and the mainland. The sea level aquifer on Camano Island discharges to the north south and east (toward Leque Island). Removing dikes on Leque Island will have no effect on the aquifers of Camano Island. I do not believe restoration of the intertidal estuary will affect seawater intrusion in Camano Island's aquifers. Freshwater flow (discharge) from Camano Island will push back on sea water intrusion. Periodic tidal inundation should periodically lessen the discharge from Camano Island so it may back up and retain more fresh water in the aquifer. Stillaguamish River water will also dilute any salinity tidal effect.

I concur with PGG's model conclusions pertaining to the groundwater restoration on Leque Island and agree with their conclusions as to effects on Camano Island as follows:

□ Increased groundwater levels beneath Leque Island will not cause a reversal of groundwater flow
directions on the eastern edge of Camano Island. The model predicts that post-restoration groundwater flow remains from Camano Island towards the Leque Lowland.

□ Groundwater changes on Camano Island due to Leque Island restoration are less than 0.1 feet.

Both of those predictions suggest no significantly increased potential for saltwater intrusion beneath eastern Camano Island. Continued groundwater flow from Camano Island to the Leque Lowland means that brackish groundwater beneath the lowland would not migrate to aquifers

beneath Camano Island.

Although the predicted rise in groundwater elevation beneath Camano Island is very small, increased groundwater heads generally result in reduced potential for saltwater intrusion based on the Ghyben-Herzberg relationship, whereby higher freshwater hydraulic heads cause the saltwater interface to deepen, thereby thickening the freshwater lens. The effects of this mechanism are likely to be negligible, but should not be viewed as adverse.

The proposed restoration will create a new hydrologic balance between shallow aquifer recharge and active drainage. The new tidal channels will likely support more efficient drainage than the currently clogged ditches. Post-restoration groundwater salinities on Leque Island are expected to show little change from current salinities.

I support anything from a full tidal restoration of WDFW owned lands to a partial restoration of 115 acres on the south end of Leque Island south of SR 532 as previously proposed in 2008.

Jerry L. Liszak, LG, LHG
Technical Unit Supervisor
Water Resources Program
Department of Ecology
(425) 649-7013